

Taxonomy of ant species (Hymenoptera: Formicidae) collected by pitfall traps from Sinai and Delta region, Egypt

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ABSTRACT

The present study includes the identification and the taxonomic status of twenty-seven species belonging to thirteen genera and three subfamilies of Egyptian formicid ants. These species are collected from South Sinai (El-Mafareq, Sahab, Wadi El-Arbaein, and Wadi El-Talaa) and Delta region (Dakahliya governorate, Ebn Salam) using pitfall traps. Illustrated Keys to the subfamilies, genera, and species are presented. In addition, the geographical and local distributions and synonyms are given to genera and species. *Tetramorium salwae* n. sp. is described as a new species which is collected from Sahab (southern Sinai). Seven species are new records to the Egyptian fauna; 1 from Ebn Salam (Dakahliya) and 6 from Sinai. These species are *Cataglyphis minimus* Collingwood, *Monomorium carbonarium* (Smith), *Cardiocondyla wroughtonii* Forel, *Aphaenogaster phillipsi* Wheeler, *Aphaenogaster syriacus* Emery, *Tetramorium brevicorne* Bondroit and *Tetramorium depressiceps* Monozzi.

depressiceps

KEYWORDS: key, ants, Formicidae, Hymenoptera, Sinai, Delta, Egypt

INTRODUCTION

Among all the wide variety of insect life on the planet, ants are one of the few forms universally recognized, there are about 15,000 living ant species belonging to 296 genera of which 9,000-10,000 have been described, all of these fall into a single family, Formicidae, which is classified into 16 subfamilies (Bolton 1994). Some comprehensive and intensive surveys have been done on neighbouring countries of Egypt, for example:-

- The survey of ants of Saudi Arabia, resulting of 164 species under 30 genera and 6 subfamilies (Collingwood 1985);
- The ants of Arabian Peninsula was reviewed, resulting a list of 265 species, 56 of which are new to science, these species are belonging to 32 genera and 8 subfamilies (Collingwood & Agosti 1996);

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- The ants of Palestine were listed resulting of 72 species, 25 genera and 5 subfamilies (Menozzi 1931);
- Finzi (1940) listed 11 species with 7 subspecies and 26 varieties from Libya;
- Tohme (1970) identified three castes of *Messor semirufus ebininus* (Forel) from Libanon

Few surveys on Egyptian ant fauna have be done mainly of Finzi (1936) who listed 89 species from Sinai during the expedition of Prince Torre Tasso to the area. Donisthorpe (1942) identified two new species from Siwa Oasis during the Armstrong College expedition in 1942. The comprehensive revision of the family Formicidae in Egypt was based on a survey of Egyptian zones excluding Sinai Peninsula and Delta regions by Mohammad 1979 during his PhD and his work never been published. In addition, many names of the genera and species in Egyptian collections are out-of-date. Therefore, the present study was designed to highlight the diversity of ant species in Egypt, focusing on the ground ant species of family Formicidae using pitfall traps in two regions: Sinai (represented by three ecologically different sites) and Delta region (represented by Dakahliya governorate).

MATERIALS AND METHODS

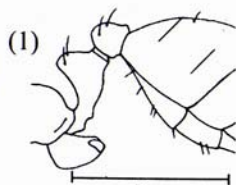
The formicid fauna from the chosen sites in Southern Sinai (W. El-Arbacin, W. El-Talaa, Sahab & El-Mafareq) and Dakahlyia (Ebn Salam) governorates was sampled from March 1998 to February 1999. The mounting technique of specimens adopted by Bolton (1994) was used. The mounted specimens were labeled and arranged in drawers provided with protective material against pest attack. A binocular microscope was used for the examination of specimens. The identification of the species and the taxonomic corrections were carried out according to Mohammad, 1979; Bolton, 1994; Collingwood & Agosti, 1996 and by referring to the main Egyptian insect collections. Specimens are deposited in the main Egyptian collections including Ain Shams collection (Ain Coll.), Cairo collection (Cairo Coll.), and Suez Canal University collection (Prof. Samy Zalal).

RESULTS

Formicid species collected in the present study from Sinai and Dakahliya governorates, have been identified and taxonomically studied. Three subfamilies, 13 genera and 27 species were the result of this study. Keys to subfamilies, diagnosis, illustrations, original references, world and local distribution, keys to all genera and species were given

Key to subfamilies of the collected species

- 1- Peduncle with two distinct segments, petiole and post petiole (Fig.1)..... Myrmicinae

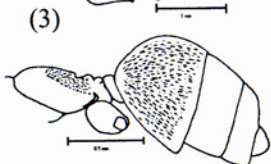


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- Peduncle with a single node or scale.....2

2- Apex of gaster with a circular orifice; petiole a distinct node or scale (Fig.2) Formicinae

- Apex of gaster terminating in a transverse slit; petiole flat and reduced, overhung by the first gasteral segment (Fig.3) Dolichoderinae



Subfamily: Dolichoderinae
Genus *Tapinoma* Förster, 1850

Tapinoma Förster, 1850, Hym. Stud.1:43 Aachen.

Type-species: *Tapinoma dufouri* Donisthorpe, 1943, Ann. Mag. Nat. Hist.(11)10:662.

Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions.

Tapinoma simrothi Krausse, 1911

Tapinoma simrothi Krausse, 1911: Bull. Soc. Ent. Ital.41:18.

Tapinoma erraticum Baroni Urbani 1964: Atti. Accad. Gioenia Scienze Naturali Catania (6):25-66.

World distribution: Sardinia & Egypt.

Distribution in Egypt: Lower Nile & Delta.

Material examined: Ebn Salam: 28.IV.1998 (2), 13.IV.1999 (3) (Ain Coll.).

Subfamily: Formicinae

Key to genera

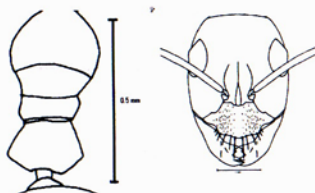
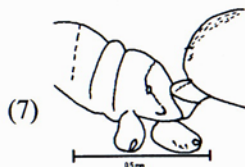
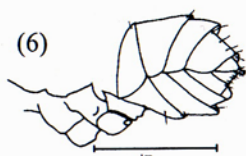
1- Antennae 11- segmented 2

Antennae 12-segmented.....3

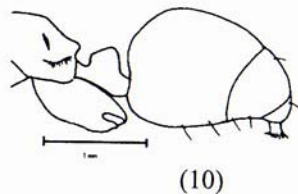
2- Propodeum armed with a pair of spines, petiole emarginated (Fig.6)....*Lepisiota* Santschi

- Propodeum unarmed, petiole never emarginated (Fig.7), in dorsal view metanotum separated from mesonotum by impressed suture (Fig.8) *Plagiolepis* Mayr

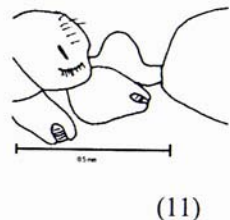
3- Antennal insertion distant from clypeal margin (Fig.9), metapleural gland orifice absent *Componotus* Mayr



Antennal insertion close to clypeal margin (Fig.4), metapleural gland orifice present (Fig.10)..... 4



4- Ocelli present and distinct, head with long curved hairs on anteroventral surface; dorsum of propodeum with erect hairs (Fig.11) *Cataglyphis* Förster



- Ocelli vestigial or absent; head with short hairs only on ventral side; dorsum of propodeum with erect bristles *Paratrechina* Motschulsky

Genus *Camponotus* Mayr, 1861.

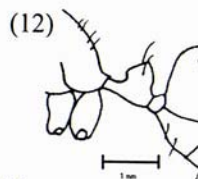
Camponotus Mayr, 1861: Europ. Formicid.:35,(Wien).

Type-species: *Formica ligniperda* Latreille, 1802, Fourmis: 88, by designation of Bingham, 1903.

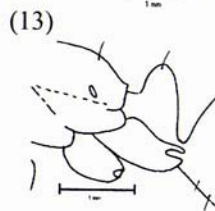
Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions.

Key to species

1- First gastral tergite with basal two thirds paler than the rest; petiole dorsum steeply rounded (Fig.12) ... *Camponotus oasium* Forel



- Gaster completely dark or with small yellowish patch at base only; petiole dorsum widely rounded to flat (Fig.13)...*Camponotus thoracicus* (Fabricius)



rubripes *Camponotus oasium* Forel, 1890

Camponotus rubripes oasium Forel, 1890: Ann. Soc. Ent.Belg.34:65.

Camponotus oasium Forel: Collingwood, 1961, Vidensk. Medd. Dansk. Naturh. Foren.123:75.

World distribution: Algeria & Egypt.

Distribution in Egypt: Lower Nile and Sinai.

Material examined: W. El-Arbaein: 3.V.1998 (3), 11.VII.1998 (5), 13.VII.1998 (5), 9.IX.1998 (9), 15.XI.1998 (3), W.El-Talaa:13.VII.1998 (6), 11.VIII.1998 (13), 9.IX.1998 (5), 15.XI.1998 (6), Sahab:13.VII.1998 (5), 9.IX.1998 (9), 15.XI.1998 (3), 10.VIII.1998 (5), 14.XI.1998 (5), 18.II.1999 (6). El-Mafareq: 1.IV.1998 (6), 2.V.1998 (6), 12.VII.1998 (8), 10.VIII.1998 (18), 8.IX.1998 (3), 14.XI.1998 (5), 18.II.1999 (4) Ebn Salam: 4.III.1999 (10) (Coll. Ain.).

Note: This species is a new record to Egyptian fauna.

***Camponotus thoracicus* (Fabricius,1804)**

Formica thoracica Fabricius, 1804: Syst. Picz.: 397.

Camponotus thoracicus Fabricius: Roger, 1862, Berl. Ent. Z.6: 205.

World distribution: Algeria & Egypt.

Distribution in Egypt: Western desert, Eastern desert, Coastal stripe, Upper Nile and Sinai.

Material examined: W.El-Arbaein: 11.VIII.1998 (2), Sahab: 10.VII.1998 (4), El-Mafareq: 2.V.1998 (2)(Coll. Ain.).

Genus: *Cataglyphis* Förster, 1850

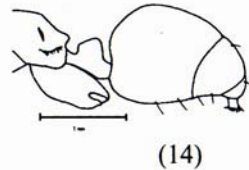
Cataglyphis Förster, 1850: Verh. Nat. Ver. Preuss. Rhinl. 7:493.

Type-species: *Formica megacola* Förster, 1850: Verh. Nat. Ver. Preuss. Rhinl.:490.

Distribution: Palaearctic, Ethiopian and Oriental regions.

Key to species

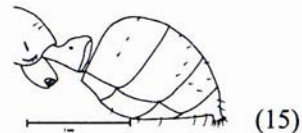
- 1- Petiole a truncated node with a flat dorsal surface sloping forward (Fig.14) 2
- Petiole a rounded node or an upright thick scale 4



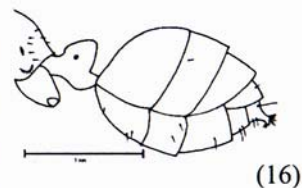
- 2- Body colour uniformly shining black *C. minimus* Collingwood.

- Body colour otherwise 3

- 3- Body unicolourous yellow, gaster oval (Fig.15); antennal scape shorter than head *C. lividus* (André)

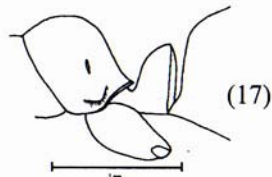


- Body bicoloured, head, alitunk, petiole and appendages bright red, gaster dark brown and globular (Fig.16), antennal scape longer than head *C. ruber* (Forel)



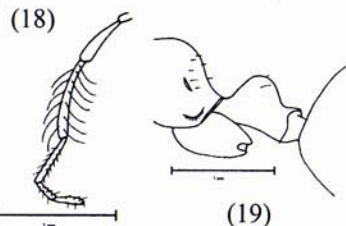
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4- Petiole an upright scale (Fig.17), body covered with silvery pubescence, reddish brown, gaster dark brown in colour; third maxillary palp with long curved hairs (Fig.18)



..... *C. sinaitica* Wheeler

- Petiole a rounded node (Fig.19), body not covered with silvery pubescence, black in colour; third maxillary palp without long curved hairs *C. niger* (André)



***Cataglyphis lividus* (André, 1881)**

Myrmecocystus albicans var. *livida* André, 1881: Ann. Soc. Ent. Fr. 6(1): 58.

Myrmecocystus albicans var. *lividus* André 1882 Spec. Hym. Europe 2:169.

Cataglyphis albicans livida André: Emery, 1925, Gen. Insect. Formicidae: 262.

Cataglyphis lividus livida André: Arnoldi, 1964, Zool. Zh. 43:1810.

World distribution: Palestine & Egypt.

Distribution in Egypt: Western desert and Sinai.

Material examined: Sahab: 1.IV.1998 (3), 2.V.1998 (2), 12.VII.1998 (8), 10.VIII.1998 (5) (Coll. Ain.)

***Cataglyphis minimus* Collingwood, 1985**

Cataglyphis minimus Collingwood, 1985: Fauna of Saudi Arabia 7:289.

World distribution: Saudi Arabia, United Arab Emirates & Egypt.

Distribution in Egypt: Sinai.

Note: This species is a newly recorded from Egypt during the present study.

Material examined: W.El-Arbaein: 11.VIII.1998 (2), Gebel Ras Abu Hebeige (Gebel Serbal): 28.V.1997 (9) (Ain Coll.).

***Cataglyphis niger* (André, 1881)**

Myrmecocystus viaticus var. *niger* André, 1881. Ann. Soc. Ent. Fr. (6)1:56.

Myrmecocystus bicolor bicolor var. *nigra* Emery, 1906 Mem. Accad. Sc. Bologna, 3:184.

Cataglyphis bicolor nigra Emery 1925: Gen. Insect. Formicidae:265.

Cataglyphis niger André: Collingwood, 1985, Fauna of Saudi Arabia 7: 290.

World distribution: Palestine & Egypt.

Distribution in Egypt: All over Egypt.

Material examined: Sahab: 1.IV.1998 (3), 2.V.1998 (9), 12.VII.1998 (4), 10.VIII.1998 (9), 11.VIII.1998 (1), 18.II.1999 (3); W. El-Arbaein: 1.IV.1998 (3), 3.V.1998 (5), 13.VII.1998 (3), 11.VIII.1998 (7), 9.IX.1998 (8), 19.II.1999 (6), Ebn Salam: 4.III.1999 (5) (Ain Coll.).

***Cataglyphis ruber* (Forel, 1903)**

Myrmecocystus albicans rubra Forel, 1903: Ann. Soc. Ent. Belg. 47:2.

Cataglyphis albicans ruber Forel: Emery, 1912, Zool. Jb. Suppl. 15 (1):99.

Cataglyphis albicans rubra Forel: Santschi, 1937, Bull. Soc. Ent. Egypte, 31:28-44.

Cataglyphis ruber Forel: Collingwood, 1985, Fauna of Saudi Arabia 7: 291.

World distribution: Algeria & Egypt.

Distribution in Egypt: Sinai.

Material examined: W. El-Arbaein: 5.III.1998 (2), 2.IV.1998 (2), 13.VII.1998 (2), 11.VIII.1998 (4) (Ain Coll.).

***Cataglyphis sinaitica*^{US} Wheeler & Mann, 1916**

Cataglyphis bombycinus var. *sinaitica* Wheeler & Mann, 1916: Bull. Mus. Harvard, 60.

Cataglyphis cursor subareolata Arnoldi, 1948:212 (Nomen nudum) Trudy Zool.

Akad. Nauk SSSR 7:206-262.

World distribution: Egypt.

Distribution in Egypt: Sinai.

Material examined: El-Mafareq: 1.IV.1998 (8), 2.V.1998 (12), 12.VII.1998 (5), 10.VIII.1998 (12), 8.IX.1998 (22), 14.XI.1998 (19), 18.II.1999 (16) (Ain Coll.).

Bolton (1995) has this as ssp
of *bombycinus* (Roger)

Genus *Lepisiota* Santschi, 1926

Acantholepis Mayr, 1861: Europ. Formicid. 42. Wien.

Lepisiota Santschi, 1926: Bolton, 1994, Identification guide to the ant genera of the world 222pp.

Type-species: *Hypoclinea frauenfeldi* Mayr, 1855: Verh. Zool Bot. Ges. Wien. 5:378.

This genus has been known as *Acantholepis* Mayr, 1861 for about 130 years but this name is a junior homonym of *Acantholepis* Krayr, 1846. *Lepisiota* Santschi, 1926 is the first available replacement name (Bolton, 1994). The new combination was then designated by Bolton five years later in the new general catalogue of the ants of the world (Bolton 1995).

Distribution: Palaearctic, Ethiopian & Oriental regions.

***Lepisiota nigra* (Della Torre, 1893)**

Acantholepis frauenfeldi var *nigra* Della Torre, 1893: Cat. Hym. 7:171.

Lepisiota nigra Emery: Agosti & Collingwood, 1987, Mitt. Schweiz. Ent. Ges. 60: 57

World distribution: Italy & Egypt.

Distribution in Egypt: Sinai.

Material examined: W. El-Arbaein: 3.V.1998 (11), 13.VII.1998 (3), 11.VIII.1998 (14), 9.IX.1998 (8), W. El-Talaa: 11.VIII.1998 (3), 19.II.1999 (4) (Ain Coll.).

Genus *Paratrechina* Motschulsky, 1863

Paratrechina Motschulsky, 1863: Bull. Soc. Nat. Moscou 36(3):13.

Type-species: *Paratrechina currens* Motschulsky, 1863: Bull. Soc. Nat. Moscou 36(3): 14.

Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions. ✓

***Paratrechina jaegerskioeldi* (Mayr, 1904)**

Prenolepis jaegerskioeldi Mayr, 1904: Res. Zool. Exp. Egypt White Nile 1: 8.

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Paratrechina jaegerskioeldi Mayr: Emery, 1925, Gen. Ins. 183:218.

World distribution: Egypt.

Distribution in Egypt: Upper Nile, Lower Nile and Western desert.

Material examined: Ebn Salam, 28.V.1998, Abu-Zabal: 15.IX.1999 (Ain Coll.).

Genus *Plagiolepis* Mayr, 1861.

Plagiolepis Mayr, 1861. Europ. Formicid Wien.: 52

Type-species: *Formica pygmaea* Latreille, 1798, Fourmis de la France: 45.

Diagnosis: Mandibles with five teeth, palp formula 6,4, antenna 11 - segmented, alitrunk short, in dorsal view, metanotum separated from mesonotum by impressed suture, propodeum unarmed, petiole a reduced scale.

Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions.

***Plagiolepis maura* Santschi, 1920**

Plagiolepis maura Santschi, 1920: Bull. Soc. Vaud. Sci. Nat. 53:169.

Plagiolepis pallescens maura Emery, 1924: Boll. Soc. Ent. Ital. 56: 8.

Plagiolepis pallescens maura Santschi, 1936: Bull. Soc. Sc. Nat. Maroc 16: 206.

Diagnosis: Body 1.8-2 mm in length, provided with sparse pubescence yellowish brown in colour, antennae with the 3rd funiculus segment quadrate, shorter than 4th World distribution: Morocco & Egypt.

Distribution in Egypt: Lower Nile and Sinai.

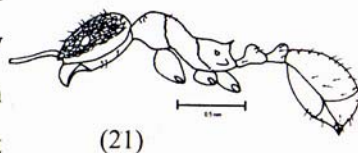
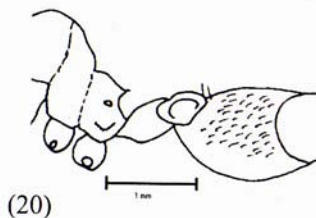
Material examined: Sahab: 3.V.1998 (6), El-Mafareq: 5.III.1998 (5), Ebn Salam: 28.V.1998 (4), 13.IV.1999 (4) (Ain Coll.).

Subfamily: Myrmicinae

Key to genera

1- Postpetiole articulated on dorsal surface of the first gastral segment, gaster on dorsal view roughly heart shaped and capable of reflection over the alitrunk. Petiole dorsoventally flattened (Fig.20) *Crematogaster* Lund

- Postpetiole articulated on anterior surface of the first gastral tergite, gaster on dorsal view not heart-shaped, not capable of reflection over the alitrunk (Fig.21), petiole not dorsoventrally flattened 2



2- Propodeum unarmed; clypeus longitudinally bicarinate below antennal insertion (Fig.22)

..... *Monomorium* Mayr

- Propodeum armed with a pair of spines or teeth; clypeus not longitudinally bicarinate below antennal insertion 3

3- Antenna 11- segmented; lateral portions of clypeus raised into a sharp-ridge on each side, in front of the antennal insertions (Fig.23)

..... *Tetramorium* Mayr

- Antenna -12 segmented, lateral portions of clypeus not raised into a sharp-ridge on each side in front of antennal insertions4

4- Mandibles rounded, antennae with and indistinct club (Fig.24), polymorphic species..... *Messor* Forel

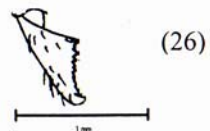
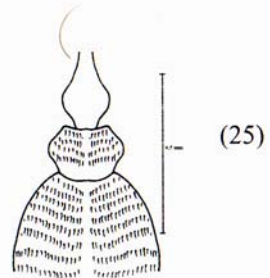
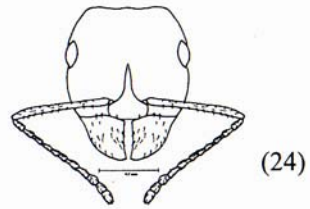
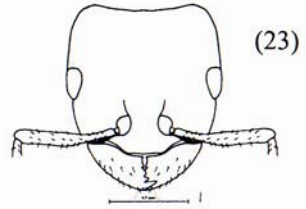
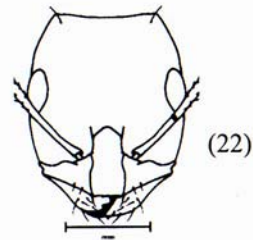
- Mandibles triangular, antennae with distinct club, monomorphic or dimorphic species 5

5- Postpetiole enlarged, cordiform from above, alitrunk with dorsal hairs (Fig.25)

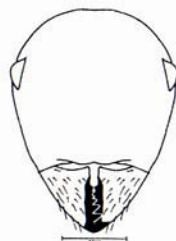
..... *Cardiocondyla* Emery

- Postpetiole not enlarged, not cordiform from above, alitrunk without dorsal hairs 6

6- Mandibles powerfully constructed, armed with 3-4 teeth, 2 large apically followed by long diastema, and then with 1 or 2 basal teeth



(Fig.26), Dimorphic species
..... *Pheidole* Westwood
- Mandibles not powerfully constructed,
armed with 5-6 teeth, without a diastema
(Fig.27), monomorphic species
..... *Aphaenogaster* Mayr



(27)

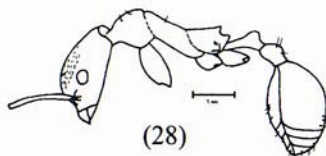
Genus: *Aphaenogaster* Mayr, 1853

Aphaenogaster Mayr, 1853: Verh. zool.-Bot. Ges. Wien. 3:101-114.

Distribution: Palaearctic, Ethiopian (Madagascar only), Oriental, Australian, Nearctic & Neotropical regions.

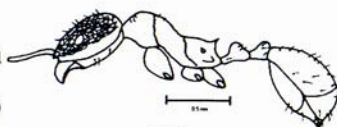
Key to species

1- Head very slender, nearly twice as long as broad, with faint longitudinal sculptures on anterior half, propodeum armed with two blunt tubercles (Fig.28)
... *Aphaenogaster phillipsi* Wheeler & Mann



(28)

- Head normal, nearly as long as broad, with strong sculptures; propodeum armed with two acute spines (Fig.29)
..... *Aphaenogaster syriacum* Emery



(29)

***Aphaenogaster phillipsi* Wheeler & Mann, 1916**

Aphaenogaster phillipsi Wheeler & Mann (1916): Bull. Mus. Comp. Zool. (60): 5.

World distribution: Palestine & Egypt.

Distribution in Egypt: Sinai.

Material examined: W.El-Arbacin: 11.VIII.1998 (1) (Ain Coll.).

Note: This species is new record to the Egyptian fauna.

***Aphaenogaster syriacum* Emery, 1908**

Aphaenogaster gibbosa syriaca Emery 1908: D. Ent. Zeit. 305-338.

Aphaenogaster syriacum Emery: Emery, 1915, Ann. Mus. Civic. Storia Nat. Genova 6(46): 244-270.

World distribution: Libanon & Egypt.

Distribution in Egypt: Sinai.

Material examined: W. El-Talaa: 19.II.1999 (1) (Ain Coll.).

syriaca

Note: This species is new record to the Egyptian fauna.

Genus *Cardiocondyla* Emery, 1869

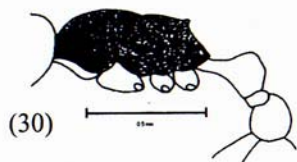
Cardiocondyla Emery, 1869: Ann. acad. Aspir. Nat. Napoli (2)2:20.

Type-species: *Cardiocondyla elegans* Emery, 1869: Ann. Acad. Aspir. Nat. Napoli (2)2: 21.

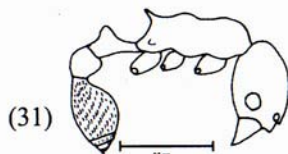
Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions.

Key to species

1- Propodeal spines very short and blunt (Fig.30); head, alitrunk, nodes and appendages reddish brown, gaster black ... *C. nuda* (Mayr)



- Propodeal spines long and acute (Fig.31); head, alitrunk, nodes and appendages yellow, gaster dark brown *C. wroughtonii* (Forel)



***Cardiocondyla nuda* (Mayr, 1866)**

Leptothorax nudus Mayr, 1866: Verh. Zool.-Bot. Ges. Wien. 16:508. Fiji

Cardiocondyla nuda Mayr: Forel, 1881, Mitt. Münch. Ent. Ver.5:6.

[syn] *Cardiocondyla minutor* Wilson & Taylor, 1967: Pacific Insects Monograph 14:55. Hawaii

[syn] *Cardiocondyla atlanta* Taylor, 1991: Mem. Queens land Mus. 30: 601. Australia

World distribution: Fiji Islands.

ssp *fajamensis* Egypt, *sculptinodis* Madag
strigifrons Java, *schuckardoides* 17

Distribution in Egypt: Sinai.

Material examined: Sahab: 1.IV.1998 (1), 14.XI.1998 (2), EL-Mafareq: 3.V.1998 (3) (Ain Coll.).

***Cardiocondyla wroughtonii* (Forel, 1890)**

Emeryia wroughtonii Forel, 1890: Ann. Soc.Ent. Belg.34:103. India

Cardiocondyla wroughtonii Forel: Forel, 1892, Verh. Zool.-Bot. Ges. Wien. 42: 313.

[syn] *Cardiocondyla hawaiiensis* Wilson & Taylor, 1967: Pac. Insec. Monog. 14:56. Hawaii

[syn] *Cardiocondyla bimaculata* Smith, 1979: Cata. Hym. Amer. Nor. Mex. 2: 1376. Taiwan

World distribution: India & Egypt.

ssp *obscurior* Taiwan
quadriceps Singapore

Distribution in Egypt: Lower Nile.

Material examined: Sallant (Dakhlyia): 28.V.1998 (10).

Note: This species is a new record to the Egyptian fauna.

Genus *Crematogaster* Lund, 1831

Crematogaster Lund, 1831: Anns. Sci. Nat. 23:132.

Type-species: *Formica scutellaris* Olivier, 1791: Encyl. Meth. Hist. Nat. Insec. 6:497.

Distribution: Palaearctic, Ethiopian, Oriental, Australian, Nearctic & Neotropical regions.

***Crematogaster aegyptiaca* Mayr, 1862**

Crematogaster aegyptiaca Mayr 1862: Verh. Zool. Bot. Ges. Wien.12: 649.

World distribution: Egypt.

Distribution in Egypt: Eastern desert, Western desert and Sinai.

Material examined: W.El-Arbacin: 1.IV.1998 (12), 2.V.1998 (4), 3.V.1998 (10), 13.VII.1998 (13), 11.VIII.1998 (8), 9.IX.1998 (6), 15.XI.1998 (7), 18.II.1999 (4), 19.II.1999(16), Sahab: 2.V.1998 (4), 18.II.1999 (4) (Ain.Coll).

Genus *Messor* Forel, 1890

Messor Forel, 1890: Annls Soc. Ent. Belg. 34.C.R:68.

Type-species: *Formica barbara* L., 1767, Syst. Nat. ed.12, 2:962.

Distribution: Palaearctic, Ethiopian, Oriental, Nearctic & Neotropical regions.

Key to species

1- Underside of head with moderately curved and straight hairs (Fig.32); head reddish-yellow

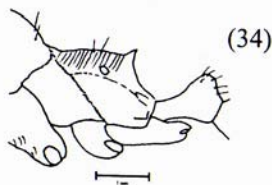


..... *M. rufotestaceus* (Föerster)

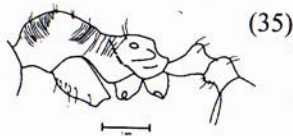
- Underside of head with at least some long J-shaped hairs (Fig.33), head black 2



2- Propodeum armed with a triangular teeth, body entirely black, dorsum of propodeum completely striated; petiole with 3 pairs of hairs(Fig.34) *M. foreli* Santschi.



-Propodeum unarmed, body entirely black except antenna and pronotum reddish, dorsum of alitrunk completely striated; presence of one pair of hairs on petiole (Fig.35)



..... *M.ebininus* Santschi

***Messor ebininus* Santschi, 1910**

Messor barbarus semirufus var *ebinina* Forel, 1910: Ann. Soc. Ent. Belg. 54: 10.

Messor semirufus var. *ebininus* Santschi, 1927: Boln. Soc. Esp .Hist .Nat. 27: 229.

Messor ebininus Santschi: Tohmé, 1970, Bull. Soc .Ent. Egypté, 54: 569-570.

World distribution: Libanon & Egypt.

Distribution in Egypt: All over Egypt.

Material examined: W.El-Arbacin: 5.III.1998 (5), 19.II.1999 (5) (Ain Coll.).

***Messor foreli* Santschi, 1923**

Messor aegyptiacus var *foreli* Santschi, 1923: Rev. Suisse Zool.30: 322.

Messor foreli Santschi: Bernard, 1981, Syst. Assoc. Spec.19:143.

World distribution: Tunisia & Egypt.

Distribution in Egypt: Sinai.

Material examined: Sahab: 14.XI.1998 (1); El-Mafareq: 1.IV.1998 (7), 2.V.1998 (9), 10.VIII.1998 (10), 14.XI.1998 (11), 18.II.1999 (11) (Ain Coll.).

Messor rufotestaceus (Förster,1850)

Förster or Foerster

Myrmica rufotestacea Förster, 1850: Verh. Naturh. Veri. Preuss. Rheinl, 74: 89.

Aphaenogaster rufotestacea Roger, 1863: Verz. Formicid. :30.

Aphaenogaster gracilinodis Emery, 1878: Ann. Mus. Stor. Nat. Genova. 12:55.

Messor rufotestaceus Förster: Emery, 1908, D. Ent. Z.: 437.

World distribution: Algeria & Egypt.

Distribution in Egypt: Eastern desert, Lower Nile and Sinai.

Material examined: W.El-Arbaein: 19.II.1999 (1). El-Kosayima (N.Sinai): 14.III.1997 (9) (Ain Coll.).

Genus *Monomorium* Mayr,1855

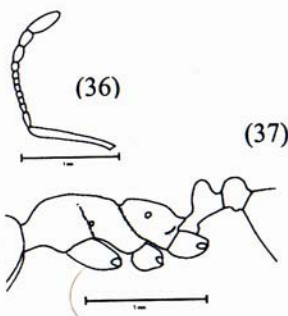
Monomorium Mayr,1855: Verh. zool. Bot. Ges. Wien.5:452.

Type-species: *Monomorium minutum* Mayr, 1855: Verh. Zool. Bot. Ges. Wien.5: 453.

Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions.

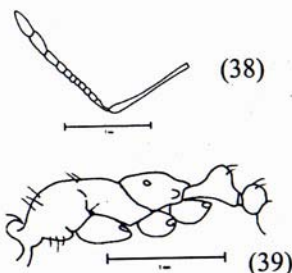
Key to species

1- Antennae with terminal funiculus segment longer than the two preceding segments together (Fig.36), unicolourous, body entirely dark black, dorsum of alitrunk without projecting hairs (Fig.37)



..... *M. carbonarium* (Smith)

- Antennae with terminal funiculus segment shorter than the two preceding segments together (Fig.38); bicolourous, head, alitrunk, nodes and appendages red, gaster black; dorsum of alitrunk with projecting hairs (Fig.39).....*M. niloticum* Emery



***Monomorium carbonarium* (Smith,1858)**

Myrmica carbonaria Smith,1858: Cat. Hym. Brit. Mus.6:127.

Monomorium minutum Mayr,1862: Verh. Zool. Bot. Wien.12:753.

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Monomorium carbonarium Smith: Roger, 1863, Berl. Ent. Z. 7:31.

World distribution: Madeira, Oman, Northern East Atlantic & Egypt.

Distribution in Egypt: Sinai.

Material examined: W.El-Arbaein: 1.IV.1998 (9), 11.VIII.1998 (8), 9.IX.1998 (10), 19.II.1999 (23); Sahab: 1.IV.1998, (5), 2.V.1998 (12), 12.VII.1998 (6), 10.VIII.1998 (7), 14.XI.1998 (12), 18.II.1999 (9); El-Mafareq: 1.IV.1998 (9), 2.V.1998 (14), 12.VII.1998 (6), 10.VIII.1998 (14), 8.IX.1998 (22), 14.XI.1998 (18), 18.II.1999 (21) (Ain Coll.).

Note: This species is new record to the Egyptian fauna.

***Monomorium niloticum* Emery, 1881**

Monomorium niloticum Emery, 1881: Ann. Mus. Civ. Stor. Nat. Giacomo. Doria 16:531.

Monomorium venustum nilotica, Forel, 1910: Ann. Soc. Ent. Belg. 54:6.

World distribution: Egypt

Distribution in Egypt: Gebel Elba and Sinai.

Material examined: W.El-Arbaein: 1.IV.1998 (3), 3.V.1998 (11), 13.VII.1998 (4), 11.VIII.1998 (7), 15.XI.1998 (11), W.El-Talaa: 3.V.1998 (3), 13.VII.1998 (6), 11.VIII.1998 (10), 9.IX.1998 (4), Sahab: 18.II.1998 (10), 19.II.1998 (12), 1.IV.1998 (9), 2.V.1998 (5), 12.VII.1998 (6), 13.VII.1998 (15), 10.VIII.1998 (16), 11.VIII.1998 (8), 14.XI.1998 (10), 15.XI.1998 (9), (Ain Coll.).

Genus *Phidole* Westwood, 1840

Phidole Westwood, 1840: Ann. Mag. Nat. Hist. 6:87.

Type-species: *Atta providens* Sykes, 1835; Trans. Ent. Soc. Lond. 1:103.

Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions.

Key to species

1- Body colour blackish brown, antennae with

3rd-11th funiculus segments quadrate

..... *Ph. pallidula* (Nylander)

- Body colour yellowish brown, antennae with

3rd-11th funiculus segments rectangular ... 2

2- Postpetiole longer than broad (Fig.40);

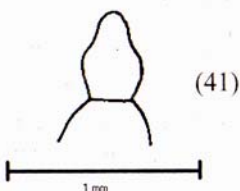
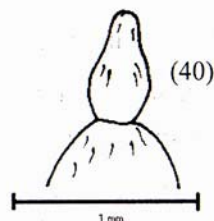
funiculus segment 2 not longer than wide

..... *Ph. jordanica* Saulcy

- Postpetiole as long as broad at middle

(Fig.41); funiculus segment 2 longer than

wide *Ph. sinaitica* Mayr



Pheidole jordanica Saulcy, 1874.

Pheidole jordanica Saulcy, 1874: Bull. Soc. Hist. Nat. Moselle 13:17.

Pheidole megacephala jordanica Emery, 1889: Ann. Museo Civ. Stor. Nat. Gen. (2) 7:442.

Pheidole jordanica Della Torre, 1893: Cata. Hym. Hucus. Descrip. Syst. Syn.7: 91.
World distribution: Palestine & Egypt.

Distribution in Egypt: Lower Nile, Sinai and Gebel Elba.

Material examined: W.El-Talaa: 11.VII.1998 (2), Ebn Salam: 28.V.1998 (9), 28.VI.1998 (4), 15.IX.1998 (5) (Ain. Coll.).

Pheidole pallidula (Nylander, 1849)

Myrmica pallidula Nylander 1849, Acta Soc. Sc.Fenn. 3:25-48.

Pheidole pallidula Nylander: Della Torre, 1893, Cat. Hym. Hucus. Desc. Sys. Syn. 7: 289.

World distribution: Sicily & Egypt.

Distribution in Egypt: Sinai.

Material examined: W. El-Arbaein: 11.VIII.1998 (2), W.El-Talaa: 11.VIII.1998 (2), 9.IX.1998 (2), 15.XI.1998 (6), Sahab: 14.XI.1998 (1). (Ain. Coll.).

Pheidole sinaitica Mayr, 1862

Pheidole sinaitica Mayr, 1862: Verh. Zool. Bot. Ges. Wien. 12:745.

World distribution: Egypt.

Distribution in Egypt: Eastern desert, Western desert and Sinai.

Material examined: W.El-Talaa: 1.IV.1998 (4), 2.V.1998 (3), 10.VIII.1998 (3), 14.XI.1998 (12) (Ain. Coll.).

Genus *Tetramorium* Mayr, 1855

Tetramorium Mayr, 1855: Verh. Zool. Bot. Ges. Wien.5: 423.

Type-species: *Formica caespitum* L.,1758: Syst. Nat., ed.10: 581.

Distribution: Palaearctic, Ethiopian, Oriental, Australian, Polynesian, Nearctic & Neotropical regions.

Key to species

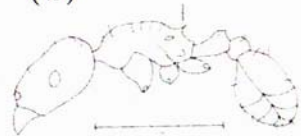
1 Body length 2.5 mm, propodeal spines relatively longer (Fig.42)

..... *T. brevicorne* Brondroit

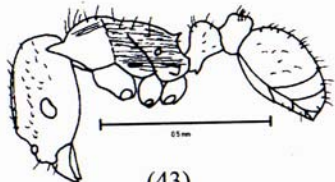
- Body length 3.5 mm, propodeal spines short

2- Dorsum of head with a distinct median depression, propodeal spines short and acute (Fig.43)..... *T. depressiceps* Menozzi

(42)

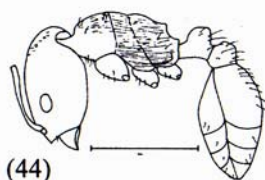


(43)



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- Dorsum of head without a median depression, propodeal armature tuberculate and blunt (Fig.44) *T. salwae* n.sp.



***Tetramorium brevicorne* (Brondroit, 1918)**

Tetramorium caspitum var. *brevicorne* Bondroit, 1918: Ann. Soc. Ent. Fr.87:108.

Tetramorium brevicorne Bondroit, 1918 in Baroni Urbani, 1964: Atti. Accad. Gioenia Sc. Nat. Catania (6)16:53.

World distribution: Corsica & Egypt.

Distribution in Egypt: Sinai.

Material examined: Sahab: 14.XI.1998 (1) (Ain. Coll.).

Note: This species is a new record to the Egyptian fauna.

***Tetramorium depressiceps* (Menozzi, 1933)**

Tetramorium semilaeve depressiceps Menozzi, 1933: Mem. Soc. Ent. Ital.12:71.

Tetramorium depressiceps Menozzi: Collingwood, 1985, Fauna of Saudi Arabia 7:264.

World distribution: Palestine & Egypt.

Distribution in Egypt: Sinai.

Material examined: W.El-Arbaein: 15.XI.1998 (6) (Ain. Coll.).

Note: This species is a new record to the Egyptian fauna.

***Tetramorium salwae* n. sp.**

Description: Body length 3.2mm, dark brown in colour, alitrunk dorsum dark brown with lateral sides yellowish brown legs yellowish brown; head with slightly concave occiput, sides moderately curved, shining and smooth with many hair pits anterior to occiput, with superficial, longitudinal sculptures anterior and below to eyes; antennae with dense hairs, first funiculus segment longer than the second and third segment together, third, fourth and fifth funiculus segments wider than long, mandibles striated with five blunt teeth and faint pubescence, anterior border of clypeus with about 3 long hairs projecting over mandibles; alitrunk shining with longitudinal sculptures in lateral and dorsal sides except mesonotum which is smooth, pronotum with several pairs of hairs, propodeum without any projecting hairs, propodeal spines reduced to short and blunt tubercles; legs with fine pubescence; petiole dorsum weakly sculptured with 2 pairs of hairs; postpetiole dorsum smooth and shining with 4 pairs of hairs, broader than long; gaster shining with numerous hairs.

Note: This species is very close to *T. juba* Collingwood (1985), but distinguished from it by sculptured alitrunk which is smooth in *T. jub* Collingwood.

World distribution: Egypt.

Distribution in Egypt: Sinai.

Material examined: Sahab: 1.III.1998 (1), 2.V.1998 (1), 18.II.1999 (3).

Type locality: Sinai, Southern Sinai, Sahab, N:28°43'.02. & E:33°46'.79., 18.II.1999 Number of individuals: 5 (Ain Coll.).

Etymology: This species was named after Dr. Salwa Kamal Mohamed, Professor of Taxonomy, Ain Shams University, Egypt.

DISCUSSION

The Egyptian Formicidae was revised by Mohammad (1979) who stated that the family was represented in Egypt by 80 species, 43 subspecies and 47 varieties belonging to 22 genera and classified under 5 subfamilies: Dolichoderinae, Dorylinae, Formicinae, Myrmicinae, and Ponerinae. He based his revision on studying the material preserved in the insect collections of Egypt and on specimens collected from different parts in Egypt. He focused his survey on two regions only, the Western desert oasis and the Red Sea region. He did not carry out any survey in Sinai Peninsula and Delta region. So, it was important to carry out a survey in these two regions. Furthermore, several taxonomic emendations to the taxa of the family Formicidae have been made on generic and species levels. Although 5 subfamilies were recorded from Egypt, this survey included only 3 subfamilies, which are:

Subfamily Dolichoderinae: Two genera only of this subfamily were recorded in Egypt, *Dolichoderus* Lund and *Tapinoma* Foerster. Only one species *Tapinoma somrothi* Krausse was collected from Ebn Salam, this species was listed from Wadi El-Tarfa by Finzi (1936).

Subfamily Formicinae: Seven genera of this subfamily were previously recorded from Egypt (Mohammed 1979), five genera were collected during this work. *Camponotus* Mayr, *Cataglyphis* Foerster, *Lepisiota* Santschi, *Paratrechina* Motschulsky and *Plagiolepis* Mayr. The genus *Acantholepis* Mayr was considered as a synonym of the genus *Lepisiota* Santschi according to Bolton (1994). One species only of this genus was collected *Lepisiota nigra* (Emery) from W. El-Arbaein. It was previously recorded from Wadi El-Tarfa (Finzi 1936).

Genus *Camponotus* Mayr was represented in Egypt by 9 species, 2 subspecies, and 5 varieties, many of these subspecies and varieties have been raised to the species level. Two species only were collected during the present study, *Camponotus oasisium* Forel, was collected from El-Mafareq, Sahab, Wadi.El-Arbaein, Wadi.El-Talaa, and Ebn Salam, and was listed in Wheeler & Mann (1914) from Wadi Feiran, and *Camponotus thoracicus* (Fabricius) which was listed later in the literature as *Camponotus compressus thoracicus* Fabricius. This species was raised to species level by Arnoldi (1964).

The genus *Cataglyphis* Foerster was represented in Egypt by 6 species, 8 subspecies and 9 varieties. Four of the six recorded species were changed to the species group, most of the varieties and subspecies were raised to the species rank. During the present work, 5 species were collected, 4 of them were listed by Mohammad (1979), namely: *Cataglyphis minimus* Collingwood, 1985, which is a new record to the Egyptian fauna, and it was previously described from Saudi Arabia; 3 subspecies of *C. albicans* group were recorded from Egypt (Mohammad 1979). These subspecies are classified as separate species as follows:

• *Cataglyphis albicans livida* (André) was raised to *Cataglyphis lividus* (André) according to Arnoldi (1964). This species was recorded from Wadi Nasib (Sinai) by Menozzi (1929).

• *Cataglyphis bicolor nigra* (André) to *Cataglyphis niger* (André)

• *Cataglyphis albicans rubra* (Forel) to *Cataglyphis ruber* (Forel)

The two latter species were raised according to Collingwood (1985).

Cataglyphis niger (André) was recorded from Wadi Scheich and West Qaà (Sinai) (Menozzi 1929), while *Cataglyphis ruber* (Forel) was recorded from Mariout (Santschi 1937). *Cataglyphis bombycinus* v. *sinaitica* Wheeler & Mann was raised to *Cataglyphis sinaitica* Wheeler & Mann, this species was described from Wadi Gazelle (Sinai).

The genus *Paratrechina* Motschulsky was represented in Egypt by 3 species, one species only *P.jaegerskioeldi*(Mayr) was collected from Ebn Salam. This species was recorded by Wheeler & Mann (1914), Alfieri (1931), Finzi (1936) & Santschi (1937).

The genus *Plagiolepis* Mayr was represented by 2 species and 3 varieties, one species was collected *Plagiolepis maura* Santschi from Sahab and Ebn Salam.

Subfamily Myrmicinae: This subfamily was represented in Egypt by ten genera. Seven genera only were collected during the present study namely: *Aphaenogaster* Mayr, *Cardiocondyla* Emery, *Crematogaster* Lund, *Messor* Forel, *Monomorium* Mayr, *Pheidole* Westwood and *Tetramorium* Mayr.

- The genus *Aphaenogaster* Mayr was represented in Egypt by 3 species, only 2 species were collected during the present study. The first is *A.phillipsi* Wheeler & Mann, was described from Palestine (Wheeler & Mann 1914), this species is very rare, only one individual was collected during the study period from Wadi El-Arbaein. The second species is *A.syracum* Emery, these two species are new records to the Egyptian fauna.

- The genus *Cardiocondyla* Emery was represented in Egypt by 3 species, 2 subspecies and 4 varieties. Only two species were collected, the first one *C. nuda* (Mayr) which was collected from El-Mafareq and Sahab, and previously recorded by Mohammed (1979), the second *C.wroughtonii* (Forel) which was collected from Sallant, (El-Mansourah, Dakahlyia). This species is widely distributed all over the world, and it is a new record to the Egyptian fauna.

- The genus *Crematogaster* Lund was represented in Egypt by 5 species, 4 subspecies and 3 varieties, only one species *C.aegyptiaca* Mayr, was collected during the present study from Sahab, Wadi.El-Arbaein, Wadi.El-Talaa and Ebn Salam.

- The genus *Messor* Mayr is represented in Egypt by 9 species, 7 subspecies and 7 varieties. During the present survey, three species were collected:

• *Messor ebininus* Forel which was considered a variety of *Messor semirufus* by (Mohammed, 1979 & Tohmé, 1970). This species was collected from Wadi.El-Arbaein while it was listed in Finzi (1936) and Santschi (1937).

• *Messor foreli* Santschi was *Messor aegyptiacus* var. *foreli* Santschi (Bernard, 1981). This species was collected from El-Mafareq and Sahab. Menozzi (1929) collected this species from West Qaà (Sinai).

• *Messor rufotestaceus* (Forel) was collected from El-Kosauima (Northern Sinai) and Wadi El-Arbaein. Wheeler and Mann (1914) collected this species from Wadi Gazelle (Sinai), while Finzi (1936) collected it from Wadi Isla (Southern Sinai).

- The genus *Monomorium* Mayr is represented in Egypt by 11 species, 7 subspecies and 5 varieties. Only two species were collected during the present study, the first is *M. niloticum* Emery which was *M. venustum nilotica* Emery (Santschi, 1936). Finzi (1936) recorded this species from El-Tor and wadi Isla (Southern Sinai), while Wheeler & Mann (1914) recorded it from Wadi Gazelle (Southern Sinai). The second one is *M. carbonarium* (Smith) which is a new record, previously recorded from the Arabian Peninsula. This species was not so far known from Africa (Collingwood 1985).

- The genus *Pheidole* Westwood was represented in Egypt by 4 species, 3 species of them were collected during the present study.

• *Ph. jordanica* Sauley, this species is a fairly common species in the Middle East region, North Africa and Saudi Arabia (Collingwood 1985), it was recorded from Wadi Fieran and Wadi El-Tarfa (Southern Sinai) (Menozzi 1929), (Alfieri 1931), (Finzi 1936).

• *Ph. pallidula* Nylander was recorded from Wadi Fieran and Wadi Gazelle (Southern Sinai) (Wheeler & Mann 1914).

• *Ph. sinaitica* Mayr was recorded from Cairo (Wheeler & Mann, 1914) (Santschi, 1937) and Sinai (Finzi 1936).

The genus *Tetramorium* Mayr was represented in Egypt by 6 species, only 3 species were collected here, two of them are new records to the Egyptian fauna, *T. brevicorne* Bondroit collected from Sahab and *T. depressiceps* Menozzi was collected from Wadi El-Arbaein and Wadi El-Talaa during the present survey.

The Egyptian new species *Tetramorium salwae* comes close to *T. juba* Collingwood, 1985, from which it can be distinguished by the clearly sculptured alitrunk. Collingwood examined our specimens and confirmed its status as a new species to the Egyptian fauna. It is a rare species, only four specimens were collected from Sahab (South Sinai) during the present study.

Up-to-date checklist of the collected ant species (* = new records to Egypt).

1) Subfamily: Dolichoderinae

Tapinoma simrothi Krausse, 1911

2) Subfamily: Formicinae

Genus: *Camponotus* Mayr, 1861

Camponotus oasium Forel, 1890

Camponotus thoracicus (Fabricius, 1804)

Genus: *Cataglyphis* Förster, 1850

Cataglyphis lividus (André, 1881)

Cataglyphis minimus Collingwood, 1985 *

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Cataglyphis niger (André, 1881)

x *Cataglyphis ruber* (Forel, 1903) *ruber*

Cataglyphis sinaitica Wheeler & Mann, 1916

Genus: *Lepisiota* Santschi, 1926

Lepisiota nigra (Della Torre, 1893) *la*

Genus: *Paratrechina* Motschulsky, 1863

Paratrechina jaegerskioeldi (Mayr, 1904)

Genus: *Plagiolepis* Mayr, 1861

Plagiolepis maura Santschi, 1920

3) Subfamily: Myrmicinae

Genus: *Aphaenogaster* Mayr, 1853

Aphaenogaster phillipsi Wheeler & Mann, 1916 *

Aphaenogaster syriacum Emery, 1908 *

Genus: *Cardiocondyla* Emery, 1869

Cardiocondyla nuda (Mayr, 1866)

Cardiocondyla wroughtonii (Forel, 1890) *

Genus: *Crematogaster* Lund, 1831

Crematogaster aegyptiaca Mayr, 1862

Genus: *Messor* Forel, 1890

Messor ebininus Santschi, 1910

Messor foreli Santschi, 1923

Messor rufotestaceus (Föerster, 1850)

Genus: *Monomorium* Mayr, 1855

Monomorium carbonarium (Smith, 1858) *

Monomorium niloticum Emery, 1881

Genus: *Pheidole* Westwood, 1840

Pheidole jordanica Saulcy, 1874.

Pheidole pallidula (Nylander, 1849)

Pheidole sinaitica Mayr, 1862

Genus: *Tetramorium* Mayr, 1855

Tetramorium brevicorne Brondroit, 1918 *

Tetramorium deprssicepes Menozzi, 1933 *

Tetramorium salwae n.sp.

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الملخص العربي

تصنيف أنواع النمل (رتبة غشائية الأجنحة- فصيلة فورمسيدي) المجموعة باستخدام المصائد الأرضية من سيناء ومنطقة الدلتا - مصر
سلوى كمال^١ - سامى زلط^٢ - حسن فضل^١ - سهير جادالله^١ - مصطفى شرف^١
١- قسم علم الحشرات - كلية العلوم - جامعة عين شمس - العباسية - مصر
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تتناول هذه الدراسة تعريف وتصنيف ٢٧ نوعاً تنتمي إلى ١٣ جنساً ضمن ٣ تحت فصائل من النمل من فصيلة فورمسيدي والمنتشر في جمهورية مصر العربية. تم جمع النمل من محافظة جنوب سيناء من عدة أماكن ذات تباين بيئي كبير من حيث الارتفاع عن مستوى سطح البحر وكمية الكساء الخضرى وهى: منطقة المفارق - منطقة سهب - منطقة وادى الأربعين ووداى إطلاح بالإضافة إلى مسح النمل الموجود فى منطقة إبن سلام بمحافظة الدقهلية وذلك باستخدام طريقة المصائد الأرضية على مدار عام كامل فى الفترة من مارس ١٩٩٨ حتى فبراير ١٩٩٩م. تم وضع المفاتيح التصنيفية الكاملة لتعريف تحت الفصائل والأجناس والأنواع المختلفة بالإضافة إلى بيان التوزيع العالمى والمحلى لكل نوع وكذلك مرادفات الأسم. تم تسجيل نوع جديد إلى الفوننا الحشرية العالمية من فصيلة فورمسيدي وهو النوع *تيترا موريم سلوىي* والذى تم جمعه من منطقة سهب بجنوب سيناء ويعتبر من الأنواع النادرة حيث تم جمع عدد أربع أفراد فقط خلال هذه الدراسة. أيضاً تم إضافة سبعة أنواع من النمل كأنواع جديدة تسجل لأول مرة من مصر (نوع تم تسجيله فى محافظة الدقهلية وستة أنواع من محافظة جنوب سيناء) وهذه الأنواع هى: *كاتاجليفيس مينيمويس كولينوود* - *مونوموريم كاربوناريم* (سميث) - *كارديوكونديلا وروفتونى فوريل* - *أفاينو جاستر فيليبسيى ويلز* - *أفاينو جاستر سورياكم إمري* - *تيترا موريم بريفيكورنى بوندروتى* - *تيترا موريم دبيريسيبسيى مونوزى*